CLAIMS

1.   A moving object detection apparatus comprising:

a motion information extraction section that
extracts motion information from a video stream
video-coded using layered coding whereby a video is coded
with being divided into a plurality of layers and motion
predictive compensation coding;

an edge information extraction section that extracts
edge information from the video stream; and

a moving object detection section that detects a
moving object using the motion information and the edge
information and outputs the detection result.

2.   The moving object detection apparatus according to
claim 1, wherein said edge information extraction section
extracts bit plane information from a highest bit plane
to Nth (N; natural number) bit plane out of bit plane
information obtained by subjecting an image to bit plane
coding as edge information from the video stream.

3.   The moving object detection apparatus according to
claim 2, wherein the video stream is divided into a
plurality of regions, and said moving object detection
section decides, when the total code length of bit plane
information inside the region is equal to or greater than
a predetermined first value, that the region is a contour

region of the moving object.

4. The moving object detection apparatus according to claim 3, wherein said moving object detection section decides, when the total code length of the bit plane information inside the region is equal to or smaller than a predetermined second value, that the region is a contour region of the moving object.

5. The moving object detection apparatus according to claim 3, wherein said motion information extraction section extracts a motion vector from a region decided to be the contour region of the moving object, and said moving object detection section decides, when the magnitude of the motion vector is equal to or greater than a predetermined third value, that the region is a contour region of the moving object.

6. The moving object detection apparatus according to claim 3, wherein

said motion information extraction section extracts a first motion vector from the region decided to be the contour region of the moving object, selects a region in the neighborhood of the region and extracts a second motion vector from the selected region, and

said moving object detection section calculates the magnitude of a difference vector between the first motion

vector and the second motion vector as a measured value and decides, when the measured value is equal to or smaller than a predetermined fourth value, that the selected region is an internal region of the moving object.

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7. The moving object detection apparatus according to claim 6, wherein

said motion information extraction section selects a plurality of regions and extracts motion vectors from

10 the respective selected regions, and

said moving object detection section determines the magnitude of the difference vector between the first motion vector and the motion vector of the selected region for each the selected region and calculates the total

15 value of the magnitudes of the difference vectors of the selected region as the measured value.

8. The moving object detection apparatus according to claim 6, wherein said moving object detection section

20 decides, when the magnitude of the difference vector between the motion vector in the region decided to be an internal region of the moving object and the motion vector of the region in the neighborhood of the region is equal to or smaller than a predetermined fifth value,

25 that the region is an internal region of the region of the moving object.

9. The moving object detection apparatus according to claim 3, wherein said moving object detection section decides that a region surrounded by the region decided to be the contour region of the moving object or the

5 internal region of the moving object is an internal region of the moving object.

10. The moving object detection apparatus according to claim 3, wherein when the number of regions decided to

10 be a contour region or internal region of a second moving object in the neighborhood of the contour region or internal region decided to be a first moving object equals or exceeds a predetermined sixth value, said moving object detection section re-decides the contour region or

15 internal region decided to be the first moving object as the first moving object.

11. A moving object detection method for detecting a moving object from a video stream, comprising the steps

20 of:
    extracting motion information from a video stream video-coded using layered coding whereby a video is coded with being divided into a plurality of layers and motion predictive compensation coding;

25   extracting edge information from the video stream; and
    detecting the moving object using the extracted

motion information and the edge information,

the steps being executed by the moving object detection apparatus that detects the moving object.

5　12.　A moving object detection program for detecting a moving object from a video stream by causing a computer to execute:

a step of extracting motion information from a video stream video-coded using layered coding whereby a video
10　is coded with being divided into a plurality of layers and motion predictive compensation coding;

a step of extracting edge information from the video stream; and

a step of detecting a moving object using the
15　extracted motion information and the edge information.

13.　A video decoding apparatus comprising:

a video decoding section that decodes a video stream coded by layered coding whereby a video is coded with
20　being divided into a plurality of layers and motion predictive compensation coding; and

a moving object detection section that detects a moving object from motion information and edge information extracted when said video decoding section
25　decodes the video stream.

14.　The video decoding apparatus according to claim 13,

wherein the video stream is divided into a plurality of regions, and when the total code length of bit plane information inside the region is equal to or greater than a predetermined first value, said moving object detection

5   section decides that the region is a contour region of the moving object.

15.   The video decoding apparatus according to claim 14, wherein when the total code length of the bit plane

10   information in the region is equal to or smaller than a predetermined second value, said moving object detection section decides that the region is a contour region of the moving object.

15   16.   The video decoding apparatus according to claim 15, wherein said video decoding section generates a video emphasizing the moving object detected by said moving object detection section.

20   17.   The video decoding apparatus according to claim 13, wherein said video decoding section generates a video made up of an edge component and emphasizes and displays the region of the moving object detected by said moving object detection section.

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18.   A video coding apparatus comprising:
       a video coding section that generates a video stream

coded using layered coding whereby a video is coded with being divided into a plurality of layers and motion predictive compensation coding; and

a moving object detection section that extracts motion information and edge information of the video when said video coding section codes the video and detects a moving object.

19. An image pickup apparatus comprising:

an image pickup section that inputs a video;

the video coding apparatus according to claim 18;

an image pickup control section that controls an image pickup function for said image pickup section based on a moving object detection result output by said moving object detection section; and

an output section that outputs the video stream and the detection result of the moving object.

20. The image pickup apparatus according to claim 19, wherein said image pickup control section controls said image pickup section so that the area of the region of the moving object output by said moving object detection section is kept to a constant proportion with respect to the total area of the input video.

21. A video monitoring system comprising:

the image pickup apparatus according to claim 19;

and

a video monitoring apparatus that decodes the video
stream received from the image pickup apparatus and
recognizes the image in the region of the detected moving
5 object using the detection result of the moving object.

22. The video decoding apparatus according to claim 1,
wherein the video stream is coded with being layered into
a basic layer and expanded layer, said motion information
10 extraction section extracts the motion information from
the video stream of the basic layer, and said edge
information extraction section extracts the edge
information from the video stream of the expanded layer.

15 23. The video decoding apparatus according to claim 1,
wherein the video stream is coded with being layered into
a basic layer and expanded layer, said motion information
extraction section extracts the motion information from
the video stream of the expanded layer, and said edge
20 information extraction section extracts the edge
information from the video stream of the expanded layer.